A167.E1565
JACC Maarch 9, 2010
Volume 55, issue 10A

VASCULAR DISEASE

BRACHIAL-ANKLE PULSE WAVE VELOCITY CORRELATED WITH AN ENDOTHELIUM-INDEPENDENT VASODILATION IN CONDUIT CORONARY ARTERY

ACC Poster Contributions
Georgia World Congress Center, Hall B5
Monday, March 15, 2010, 9:30 a.m.-10:30 a.m.

Session Title: Vascular Physiology-- Pathophysiology–Clinical
Abstract Category: Vascular--Pathophysiology–Clinical
Presentation Number: 1167-361

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Background: It is known that brachial-ankle pulse wave velocity (baPWV) is a noninvasive and simple examination, and able to evaluate arterial stiffness. However, the relationship between baPWV and coronary artery function remains unclear. The purpose of this study is to elucidate the association between baPWV and coronary artery function.

Methods: Seventy-one consecutive patients (49 men, 22 women, mean age 61±13 years) with normal or mildly diseased coronary arteries were enrolled. Vascular reactivity was assessed by intracoronary administration of papaverine, acetylcholine, and nitroglycerin using a Doppler guidewire. A bolus of papaverine induces an endothelium-independent vasodilator in resistance coronary arteries, infusion of acetylcholine induces an endothelium-dependent vasodilator in resistance and conduit coronary arteries, and a bolus of nitroglycerin induces an endothelium-independent vasodilator in conduit coronary arteries. BaPWV was measured using automated device.

Results: Mean value of baPWV was 1645±379 cm/sec. Univariate analysis demonstrated that baPWV significantly correlated with percent change in coronary artery diameter induced by nitroglycerin (%NTG) ($r=0.375$, $p<0.01$), although baPWV did not correlated with percent change in coronary blood flow induced by acetylcholine or papaverine and percent change in coronary artery diameter induced by acetylcholine. In addition, fasting blood sugar (FBS) and systolic blood pressure (SBP) of atherosclerotic risk factors also significantly correlated with the %NTG. Multiple regression analysis using baPWV as an objective variable, adjusted by FBS and SBP, as explanatory variables, revealed that baPWV independently correlated with %NTG.

Conclusions: BaPWV independently correlated with %NTG, suggesting that arterial stiffness associated with the endothelium-independent coronary artery function.